

REMARKS

This is a response to the Office Action mailed March 19, 2004. Claims 1, 4, 5-8, 62 will be pending upon entry of the present amendment. Claim 44 and 45 have been amended.

Elections/Restrictions

Claims 5-9, 11-15, 17-19, 21-23, 37, 31-33, and 36-41 were withdrawn from further consideration as being drawn on a non-elected species.

Applicants believe that claim 5 was improperly withdrawn and is considered in the case for examination.

The Examiner states that claim 5 was withdrawn as depending on non-elected claim 41. The applicants respectfully suggest that the previous amendment of claim 5 was misread. Claim 5 was amended by the amendment dated September 15, 2003, to depend on claim 1. Prior to entry of the September 15, 2003, amendment, claim 5 depended on claim 4. Applicants believe that due to the transmittal of the September 15, 2003, amendment by facsimile, the strike-through of the "4" was not clearly visible since the strike, was on top of a portion of the number 4, as follows. Thus the amendment was mis-entered. Accordingly, claim 5 depends on an elected species of claim 1 and is properly in the case.

Rejections Under 35 U.S.C. §103

Claims 1, 4, and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Cozad et al. (U.S. Patent 6,160,243) in view of Sosnowski et al. (U.S. App 2003/0190632).

Applicants strongly disagree Cozad and Sosnowski, even if combined, do not disclose, teach, or suggest the features of claim 1. Claim 1 recites, *intra alia*, "at least one transistor formed in the semiconductor material and operable to generate heat above a selected threshold" Applicants agree with the Examiner's statement that Cozad does not teach a heat-generating transistor formed in the semiconductor material. Further, Sosnowski fails to disclose such a transistor. The Examiner points to page 13, paragraph 164 of Sosnowski as teaching transistors incorporated into silicon. However, the Examiner does not state that in

Sosnowski, the transistors are used for heating or that they are in the same semiconductor material that forms the fluid chamber. This failure of the Examiner to state that the transistors in Sosnowski provide heating is because they do not.

The Sosnowski semiconductor device included no means of heating the sample. In fact, Sosnowski clearly teaches away from the use of an integrated heating device. For example, page 40, paragraph 528 states as follows: "the sample was heated to 100 deg. C. and quickly cooled to room temperature. About 5 μ l of this sample was placed directly on the chip surface." It is clear that the act of heating and cooling the sample are prior to placement on the chip, clearly indicating that such heating means are external to the chip.

Further, heat is generally considered an undesirable byproduct of transistor operation and can result in unintended operation or even failure of the transistor device. In a device such as taught by Sosnowski, the unintended heating of a sample by a transistor is likely to interfere with measurements being taken by the device. Sosnowski teaching away from using heat from the transistors in the chip by requiring that the sample be heated in a separate vessel are then cooled.

Sosnowski adds nothing to the Cozad reference; it is merely a statement that transistors have been formed in silicon, something applicants admit is known in the art. What is not known, and is patentable in claim 1 is the use of a transistor to provide heat to a fluid chamber formed in the same semiconductor material as the transistor itself.

Cozad teaches forming transistor 92 from a first material. At a separate location, at a different time and using a completely different substrate and materials, boiler 90 is formed.

At some later point in time, transistor 92 is connected to the boiler 90.

This is vastly different than the present invention. According to claim 1, the transistor and fluid retaining chamber are integral in the same semiconductor material. The recognition by the invention that the same substrate could provide both the transistor and the fluid chamber is a novel and nonobvious structure over any prior art reference. A great savings in size, and time to create the chamber and heater as well as the precision in locating the heater next to the chamber are obtained by use of the transistor that can be formed in the same semiconductor substrate.

For the reasons discussed above, neither Cozad and/or Sosnowski, even if combined, disclose, teach, or suggest the features of claim 1. Accordingly, claim 1 is allowable.

Claim 4 is patentable for reasons beyond the patentability of claim 1. Claim 4 states that the semiconductor material containing the transistor has a wall (such as region 28 of Figures 1 and 2) and a body region (such as the sides of region 12 of Figure 1 or the upper body 38 of Figure 2) that together are part of the semiconductor material that form the integrated heater. This feature is clearly patentable and is not found in the prior art.

Claim 5 is patentable for reasons beyond the patentability of claim 1 since it teaches that the dielectric layer extends between the semiconductor material and the fluid, a topic on which all prior art is silent.

Claims 24-26, 28-30, 34-35, 42-45, 47, and 49 are rejected under 35 U.S.C. §103(a) as being unpatentable over Cozad et al. (U.S. Patent 6,160,243) in view of Sosnowski et al. (U.S. App 2003/0190632) and further in view of Williams (U.S. Patent 5,243,212) and Jang et al. (U.S. Patent 6,624,065).

Cozad, Sosnowski, Williams, and Jang, even if combined, do not disclose, teach, or suggest the features of claim 24. Claim 24 recites, *intra alia*, “a channel region disposed in the semiconductor substrate between the source and drain regions to conduct electric current between the source and drain regions, the channel region having a resistance when conducting current to generate heat above a selected threshold... .” For the reasons discussed above, Cozad and/or Sosnowski, fail to disclose, teach, or suggest a channel region disposed in a semiconductor substrate, and configured to generate heat. Further, neither Williams nor Jang disclose, teach, or suggest the generation of heat by use of a channel region disposed of in a semiconductor substrate. Williams and Jang appear to be nothing more than standard transistors in semiconductor substrates. Applicant’s admit that transistors of this type have been known for many years. These tend to show that the prior art teaches away from the invention. No one, prior to applicants own disclosure, have placed the transistor components of the channel, the source and the drain in the same substrate from which the heating chamber is formed.

Claim 24 makes clear that the transistor is an MOS transistor; claim 1 covers either bipolar or MOS transistors. Accordingly, neither Cozad, Sosnowski, Williams, nor Jang,

even in any combination, disclose, teach, or suggest the features of claim 24. Thus claim 24 is allowable.

Cozad, Sosnowski, Williams, and Jang, even if combined, do not disclose, teach, or suggest the features of claim 44. Claim 44 recites, *intra alia*, "a channel region disposed in the semiconductor substrate between the source and drain regions to conduct electric current between the source and drain regions, the source, drain and channel regions producing heat when conducting current to generate heat above a selected threshold..." For the reasons discussed above, Cozad and/or Sosnowski, fail to disclose, teach, or suggest a source, drain or channel region disposed in a semiconductor substrate, and configured to generate heat. Further, neither Williams nor Jang disclose, teach, or suggest the generation of heat by use of a source, drain or channel region disposed of in a semiconductor substrate. Accordingly, neither Cozad, Sosnowski, Williams, nor Jang, even in any combination, disclose, teach, or suggest the features of claim 44. Thus claim 44 is allowable.

Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable.

If there are any informalities or questions that can be addressed via telephone, the Examiner is requested to contact the undersigned attorney at (206) 622-4900.

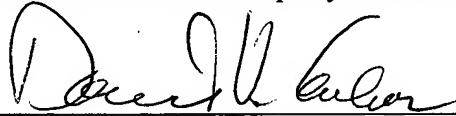
The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Application No. 10/029,533
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All of the claims remaining in the application are now clearly allowable.
Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

A handwritten signature in black ink, appearing to read "David V. Carlson", written over a horizontal line.

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